

Re Section V.

- 1 In the present opinion, reference is made to the following documents:

D1 : DE 100 37 211 A (DELPHI TECH INC) 5 April 2001 (04-05-2001)

- 2 Document D1 is considered to be the closest related art. It discloses (the references in parentheses relate to this document):

A device (Fig. 1a) for measuring an angular movement in a vehicle steering system, comprising a shaft (Fig. 1a, pos. 12), which is rotationally mounted in a frame (Fig. 1a, pos. 26; column 2, lines 3-63), and on which an element (Fig. 1a, pos. 14) axially displaceable in the direction of the shaft is positioned; the axially displaceable element being connected to the shaft via a geared connection (Fig. 1a, pos. 10; column 3, lines 40-51) that converts the angular movement of the shaft into a longitudinal movement; the axially displaceable element being guided in an axial direction by a longitudinal guide (Fig. 1a, pos. 20); and comprising a detection device (Fig. 1a, pos. 18,30) that measures the longitudinal movement of the axially displaceable element (Fig. 1a, pos. 14); wherein a frame-side component (Fig. 1a, pos. 16) of the longitudinal guide (6) contacts the axially displaceable element at first surfaces (Fig. 1b, perpendicular boundary surfaces of pos. 16 inside the guide pos. 20), which run straight with respect to each other and run perpendicularly in a straight-line in the axial direction of the axially displaceable element, and the axially displaceable element and

the shaft mesh via transverse surfaces (Fig. 1a, pos. 10) of the geared connection

from which the subject matter of independent Claim 1 differs in that:

the one component of the prestressed longitudinal guide [rests] against the axially displaceable element at transverse surfaces that run at an angle to each other and in the axial direction of the axially displaceable element, and the axially displaceable element and the shaft mate in a backlash-free manner via second transverse surfaces of the geared connection, the first transverse surfaces between the frame-side component and the axially displaceable element, and the second transverse surfaces of the geared connection, having the same inclination directions with respect to each other.

2.1 Therefore, the subject matter of Claim 1 is novel (Article 33 (2) PCT).

Thus, the object to be achieved by the present invention may be regarded as:

[eliminating, reducing] measurement inaccuracies in the reading [measuring] of a longitudinal movement produced by rotation, the measuring inaccuracies being caused by backlash and clearance inside the same geared connection.

2.2 The means provided in Claim 1 of the present application for achieving this object are based on an inventive step (Article 33(3) PCT) for the following reasons:

None of the documents known from the related art discloses a device in a steering system for measuring a steering movement,

having a component which produces an initial stress and, through special shaping, namely the shape of a trapezoid, as well as through a special proportionality of this to the gear-tooth slope of the gear unit (or ball nut, thread), produces backlash-free engagement of the parts referred to.

2.3 Claims 2 through 17 are dependent from Claim 1, and therefore, they also fulfill the PCT requirements with regard to novelty and inventive step.


A device described above under section 2.2 could not be produced from any of the documents known from the related art, by combining the content and teachings and/or without a special inventive step.

2.4 The same line of argumentation is equally applicable to the second independent claim, namely Claim 18.

Steering wheel position sensor has galvanomagnetic sensor that partly moves with object/shaft, is partly fixed with respect to frame to output signal representing shaft's position

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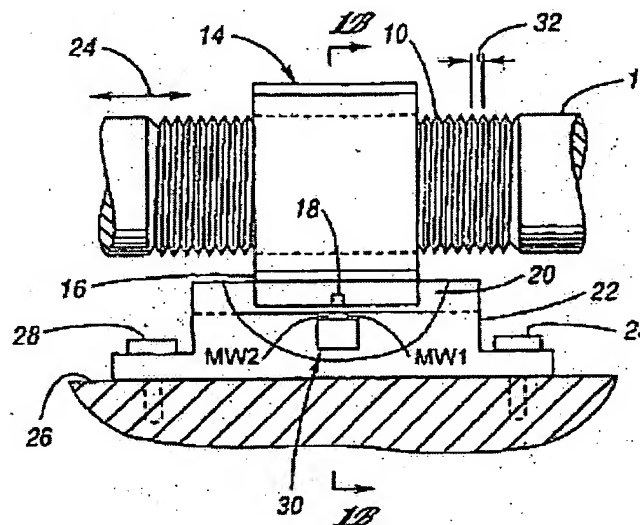
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Abstract of DE10037211

The sensor has an object (14) engaged with a threaded section of a steering shaft (12) rotatable w.r.t a fixed frame, whereby the object moves axially over a defined range as the shaft turns over a defined range. A galvanomagnetic sensor (30) partly moves with the object and is partly fixed w.r.t the frame to output a signal representing the shaft's rotary position. A galvanomagnetic irregularity is connected to the object. Independent claims are also included for the following: a method of determining the rotary position of a steering wheel.



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